WHAT IS CLAIMED IS:

1. In a continuous process for generating hydrogen from a hydrocarbon feed that contains one or more organosulfur compounds by reforming the hydrocarbon feed to provide a reformate containing hydrogen, carbon dioxide and carbon monoxide and reducing the concentration of carbon monoxide in the reformate, the improvement comprising:
   a) contacting at least a portion of the feed with a bed of solid sorbent capable of reversibly sorbing at least one of said organosulfur compounds under sorption conditions for a time sufficient to sorb at least a portion of said at least one organosulfur compound to provide a sorption effluent, said bed being one of two or more beds adapted to cycle between sorption and desorption modes,
   b) reforming the sorption effluent in the presence of steam under reforming conditions to provide a hydrogen-containing stream,
   c) passing a regeneration gas comprising at least one of a combustion fuel, provided that the fuel has an essential absence of sulfur compound, and oxygen-containing gas to at least one other bed containing said solid sorbent under desorption conditions to regenerate the bed by removing sorbed organosulfur compound which organosulfur compound becomes contained in said regeneration gas to provide an organosulfur-containing purge, and using the organosulfur-containing purge in a combustion to provide heat for use within the process and to convert organosulfur compound to sulfur dioxide, and
   d) cycling the bed of step (a) to step (c) and the bed of step (c) to step (a).
2. The process of claim 1 wherein the regeneration gas comprises oxygen-containing gas.
3. The process of claim 1 wherein the hydrogen-containing stream of step (b) is fed to a fuel cell, an anode waste gas is withdrawn from the fuel cell, and the regeneration gas comprises at least a portion of the anode waste gas.
4. The process of claim 1 wherein the regeneration gas further comprises water vapor.
5. The process of claim 4 wherein the sorption and desorption is by water displacement.

6. The process of claim 4 wherein the sorbent comprises hydrophobic molecular sieve.
7. The process of claim 1 wherein the sorbent comprises molecular sieve ion exchanged with one or more transition metals.
8. The process of claim 1 wherein the organosulfur-containing purge is subjected to further sulfur removal prior to combustion.
9. The process of claim 1 wherein the further sulfur removal comprises hydrodesulfurization to convert organosulfur compounds to hydrogen sulfide and reactive sorption to sorb hydrogen sulfide.
10. A hydrogen generator for producing hydrogen from a hydrocarbon feed which also contains at least one organosulfur compound comprising:
    a) a reformer in fluid communication with a supply of water for steam;
    b) a combustor in fluid communication with a supply of oxygen-containing gas and with a supply of combustion fuel, said combustor adapted to combust the combustion fuel with the oxygen-containing gas to provide an effluent and provide heat within the hydrogen generator, and
    c) at least two zones containing solid sorbent wherein one zone has an inlet in fluid communication with a supply of hydrocarbon feed and an outlet in fluid communication with the reformer to provide hydrocarbon feed for reforming such that the hydrocarbon feed passes through said one zone to contact solid sorbent, and wherein another zone has an inlet in fluid communication with a supply of regeneration gas comprising at least one of oxygen-containing gas and combustion fuel and an outlet in fluid communication with the combustor such that the supply of regeneration gas passes through said another zone to contact solid sorbent, said outlet being in fluid communication with the combustor to provide at least one of oxygen-containing gas and combustion fuel, said zones being in a relationship to enable solid sorbent to cycle between contacting the hydrocarbon feed and the purge gas.
11. A hydrogen generator and fuel cell system comprising the hydrogen apparatus of claim 10 and further comprising

a) a carbon monoxide removal zone in fluid communication with the reformer to receive the hydrogen and carbon monoxide effluent and produce a hydrogen product gas; and

b) a fuel cell in fluid communication with the carbon monoxide removal zone to receive on an anode side the hydrogen product gas and in communication with a supply of oxygen-containing gas on a cathode side, said fuel cell having an anode waste gas port and a cathode waste gas port,

c) in which at least one of the anode waste gas port and the cathode waste gas port is a supply of regeneration gas.

12. The hydrogen generator and fuel cell of claim 11 in which the anode waste gas port is the supply of regeneration gas.

13. An apparatus for removing sulfur compounds including CXS, wherein X may be oxygen or sulfur, from a hydrocarbon-containing gas stream comprising:

a) a first reactor having a gas stream inlet and a spaced apart gas stream outlet, said first reactor containing a bed of catalyst positioned such that a gas stream passing from said inlet to said outlet passes through said bed, said catalyst comprising a hydrolysis catalyst capable of promoting the reaction of CXS with water vapor at a temperature of less than about 100°C, and

b) a second vessel having a gas stream inlet in fluid communication with the gas stream outlet of the first reactor and a gas stream outlet, said second vessel containing a bed of solid sorbent positioned such that a gas stream passing from said inlet to said outlet passes through said bed, said solid sorbent being capable of sorbing dimethyl sulfide at a temperature of 50°C from a methane stream containing 50 ppmv water.

14. An apparatus for removing sulfur compounds including CXS, wherein X may be oxygen or sulfur, from a hydrocarbon-containing gas stream comprising:

a) a first vessel having a gas stream inlet and a gas stream outlet, said first vessel containing a bed of solid sorbent positioned such that a gas stream passing from said inlet to said outlet passes through said bed,

said solid sorbent being capable of sorbing dimethyl sulfide at a temperature of 50°C from a methane stream containing 50 ppmv water,

b) a means to introduce water vapor into a gas stream, said means being in fluid communication with the gas stream outlet of the first vessel,

c) a second vessel having a gas stream inlet in fluid comunication with the means for introducing water into a gas stream and a spaced apart gas stream outlet, said second vessel containing a bed of catalyst positioned such that a gas stream passing from said inlet to said outlet passes through said bed, said catalyst comprising a hydrolysis catalyst capable of promoting the reaction of CXS with water vapor at a temperature of less than about 100°C, and

d) a third vessel having a gas stream inlet in fluid communication with the outlet of the second vessel and a spaced apart gas stream outlet, said third vessel containing a solid bed of sorbent for hydrogen sulfide positioned such that a gas stream passing from said inlet to said outlet passes through said bed.

15. A process for removal of sulfur compounds, including organosulfur compounds and CXS, wherein X may be oxygen or sulfur, from a hydrocarbon stream containing the same comprising:

a) providing a hydrocarbon-containing gas containing from about 5 to 100 moles of water per mole of CXS ,

b) contacting said stream under hydrolysis conditions including a temperature of about 25° to 100°C with hydrolysis catalyst for a time sufficient to hydrolyze at least about 70 percent of the CXS to hydrogen sulfide and carbon dioxide and produce a hydrocarbon-containing stream having reduced CXS content, and

c) contacting the stream having reduced CXS content with a solid sorbent tolerant of water and capable of sorbing organosulfur compound and hydrogen sulfide, said contacting being under sorption conditions including a temperature of less than about 50°C for a time sufficient to

sorb at least about 70 mole percent of the total sulfur compounds contained in the stream having a reduced CXS content.

16. The process of claim 15 wherein the hydrolysis catalyst comprises at least one of alumina, titania, and zirconia having a surface area of at least about 100 square meters per gram (B.E.T.).

17. The process of claim 15 wherein the sorbent comprises molecular sieve ion exchanged with one or more transition metals.

18. A process for removal of sulfur compounds, including organosulfur compound, and CXS, from a hydrocarbon stream containing the same comprising:

a) contacting the stream under sorption conditions including a temperature of less than about 50°C with a solid sorbent tolerant of water and capable of sorbing organosulfur compound for a time sufficient to remove at least about 70 mole percent of the organosulfur compounds but less than about 50 percent of the CXS, to provide a CXS-containing effluent,

b) adding water to the CXS-containing stream to provide about 5 to 100 moles of water per mole of CXS,

c) contacting the water containing stream under hydrolysis conditions including a temperature of about 25° to 200°C with hydrolysis catalyst for a time sufficient to hydrolyze at least about 70 percent of the CXS to hydrogen sulfide and carbon dioxide to produce a hydrogen sulfide-containing stream having reduced CXS content, and

d) contacting the stream having reduced CXS content with a solid sorbent capable of sorbing hydrogen sulfide, said contacting being under sorption conditions for a time sufficient to sorb at least about 70 percent of the hydrogen sulfide.

19. The process of claim 18 wherein the sorbent for removal of organosulfur compounds comprises molecular sieve ion exchanged with one or more transition metals.

20. The process of claim 18 wherein the hydrogen sulfide sorbent comprises at least one of zinc hydroxycarbonate, zinc oxide, iron oxide, iron hydroxycarbonate and copper oxide or nickel on alumina.